



# GEORGIA ROADS

A Newsletter of Georgia's Technical Assistance Program

Vol. 18, No. 2 Fall 2008



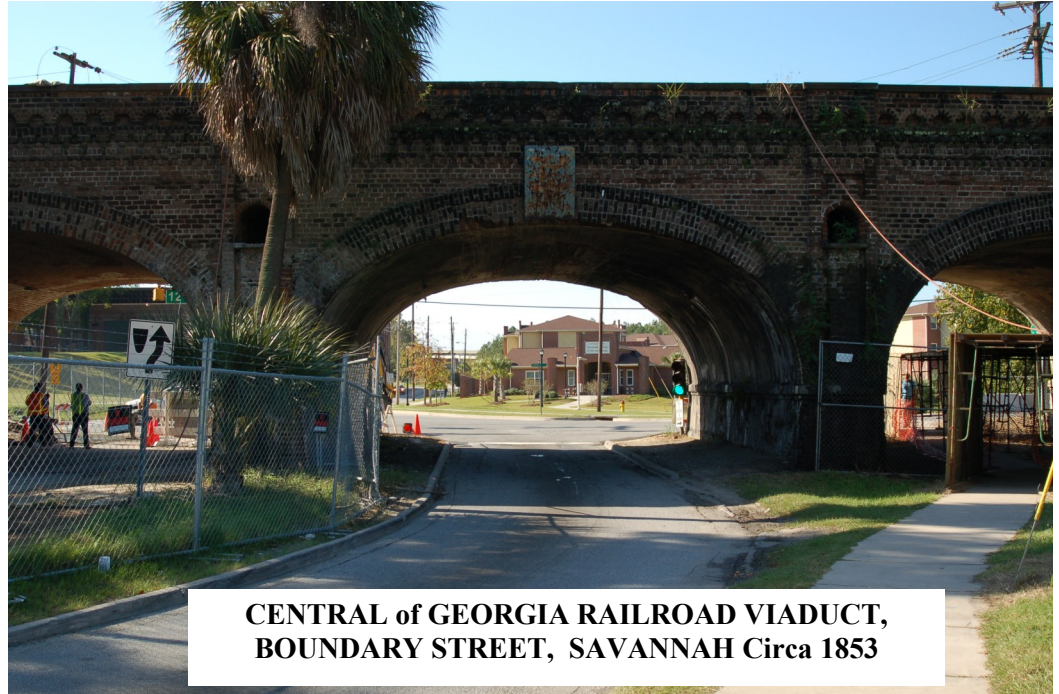
**"BETTER ROADS THROUGH COOPERATION"**

## Work Zone Safety Classes

The LTAP Office has two "Tailgate Trainers" who can come to your area to present training. Work Zone Safety is one of the most popular programs they present, but they are also available for hands on training and technical advice on a variety of roadway maintenance operations. Contact the LTAP office for information.

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**CENTRAL of GEORGIA RAILROAD VIADUCT,  
BOUNDARY STREET, SAVANNAH Circa 1853**

## OLD TECHNOLOGY MAKES A COMEBACK

The Arch Bridge is back in style after declining in popularity over the last century. The Central of Georgia Railroad Bridge above is more than 150 years old and is on the Historic American Engineering Record. This type of bridge was mostly abandoned in the late 1800's due to the advanced technology of steel and reinforced concrete beams. Recently Arch Bridges utilizing new technology are being constructed throughout the country in order to meet specific needs.

The new Arch Bridges are often referred to as "Bottomless Culverts". The new technology that has made this practical is using precast reinforced concrete segments to construct the arch. The use of precast arches can greatly speed construction time. Another reason for their use is reduced environmental impact on the streams compared to a box culvert. High load bearing capacity, resistance to icing, and a pleasing appearance are also reasons for the renewed popularity of arches.

The foundations are designed to fit the location and to support the bridge and earthwork. Various types of foundations such as piling or spread footings can be used to support the Arch bridges. They are often used in conjunction with Mechanically Stabilized Earth (MSE) retaining walls and aesthetic treatments when used in locations where appearance is a concern. Georgia DOT has built several in recent years. (continued **New Arch Bridges** p. 4)

(Related article, **Bridge Restoration** p 10).



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The Local Technical Assistance Program (LTAP) is a nationwide effort financed jointly by the Federal Highway Administration and individual state departments of transportation and/or universities. Its purpose is to disseminate the latest state-of-the-art technologies in the areas of roads, highways and bridges to municipal and county highway and transportation personnel.

The Georgia LTAP is supported by FHWA and the Georgia Department of Transportation. The Georgia Roads Newsletter is one of the LTAP activities. The opinions, findings or recommendations expressed in this newsletter are those of the Georgia LTAP Center and do not necessarily reflect the views of the FHWA nor the Georgia Department of Transportation.

The Georgia Roads Newsletter is distributed free of charge to counties, cities, towns and others with transportation responsibilities.



### Videos

Pipe Trench Compaction

Blading Unpaved Roads

### DVDs

Reduce Congestion through Access Management-FHWA

Defensive Flagging: A Survivors Guide—FHWA /English and Spanish

Industrial and Agricultural Mower Safety Practices—Alamo Group / English & Spanish

### CD

High Performance Materials Training Seminars—FHWA

Roadway Safety + Disaster Response—ARTBA

Community Impact Assessment—Resources—TRB

Snow and Ice Control—AASHTO

### Publications

Roadside Revegetation-FHWA

Roundabouts: An Informational Guide—FHWA

Designing Sidewalks and Trails for Access— FHWA

### **ASK US ABOUT OTHER TOPICS**



**Cover Photo:** The Central of Georgia Brick Arch Viaduct is no longer used by the railroad. It is currently being repaired and restored to its original condition. It is located in downtown Savannah a short walk from River Street in the Historic District. If you are in Savannah be sure to check it out. There is an another brick arch bridge from the late 1800's less than 100 yards away.

## APPLICATIONS FOR STATE AID DUE DECEMBER 31

The Georgia Department of Transportation's revamped State Aid program is currently accepting applications from city and county governments to obtain grants to improve their local transportation infrastructure. Applications for State Aid will be accepted through December 31, 2008 for the fiscal year 2010 program.

Cities and counties are encouraged to develop joint priority projects; each application package must include project need and benefit justification. Project applications will be grouped into categories of work, e.g. turn lanes, intersections, etc. Then each local government's turn lane project, for example, will compete against all turn lane project applications in the local government's Congressional District.

Local government grantees are restricted to a maximum allocation of \$750,000 per year for either single or multiple project applications. Local governments will be responsible for all preliminary engineering, environmental and right-of-way activities.

According to Terry Gable, State Aid program administrator, the new State Aid Grant Program is based on sound engineering principles and a benefit versus cost ratio, allowing the Department to fund the projects that promote interconnectivity, safety, and that maximize joint planning for local and regional growth.

The Department revised the program in spring 2008 with advice and input from an Advisory Committee composed of officials of the Department, the Association County Commissioners of Georgia (ACCG), the state Department of Community Affairs and the Georgia Municipal Association (GMA).

The State Aid budget for fiscal year 2010 has yet to be determined; however, Gable noted that the allocation will be divided among the 13 Congressional Districts, less 20 percent held in a contingency fund (to account for unanticipated needs such as a sudden economic development opportunity or weather related or disaster related event).

Grant selections will be made in the spring of 2009 with input from the Advisory Committee.

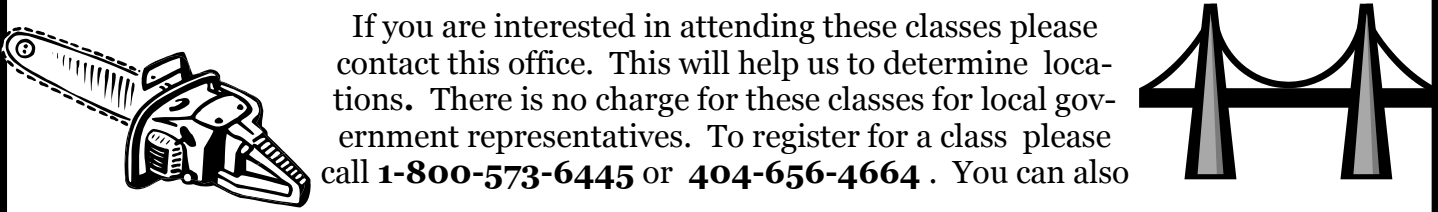
For additional information, please visit the Frequently Asked Questions link on the State Aid webpage at [www.dot.ga.gov](http://www.dot.ga.gov), or email Terry Gable at [tgable@dot.ga.gov](mailto:tgable@dot.ga.gov).



### TRAINING CALENDAR

DATE	EVENT	LOCATION
December	Work Zone Safety –	Locations to be determined
January 14	Surveying	Location to be determined
2009	Bridge Inspection and Maintenance	Statewide

If you are interested in attending these classes please contact this office. This will help us to determine locations. There is no charge for these classes for local government representatives. To register for a class please call **1-800-573-6445** or **404-656-4664**. You can also





## New Arch Bridges (continued)

The main reason GDOT has used “Bottomless Culverts” is to meet environmental constraints when constructing a crossing over designated trout streams or other environmentally sensitive streams. The Jefferson Street project in LaGrange used an arch bridge design because it allowed more clearance over the railroad tracks without raising the profile grade. This

The two arch culverts in Cherokee County that are shown on the opposite page were constructed over streams harboring the threatened Cherokee Darter. Bottomless culverts were a requirement of the environmental commitments agreed to during the environmental permitting process.

They were both erected on spread footings. The construction of the footings for the arch culverts adjacent to the environmentally sensitive stream was a challenge.



**Jefferson St. Bridge over CSX Railroad, Lagrange 2007**

allowed the bridge to be replaced with less required Right of Way.

The Jefferson Street Bridge shown above has a 50 foot span. The Arches were erected on top of 21 feet tall retaining walls to assure 23 feet of vertical clearance over the railroad tracks. The arch sections were placed over three days during times when track clearance was available. The rest of the work was then able to proceed without conflict with the railroad traffic of 14 trains a day. This bridge is located in the historic section of the City of LaGrange and appearance was also a priority. The arch in conjunction with the Mechanically Stabilized Earth (MSE) Retaining Wall used for the embankment have a pleasing appearance that enhances the area.

Another challenge when using these precast arches is that the footings must be



surveyed and poured exactly. The arches fit into a keyway in the footing that is grouted. The keyway was misaligned in one footing requiring it to be removed and re-poured.

The contractor learned from that experience and took care to assure this was not repeated. The Eagle Drive arch was especially challenging as it has three different skews in order to follow the streambed. In addition to grouting the keyway, the joints between precast sections are grouted and sealed with a waterproofing membrane.

Expect to see these precast arches used to solve challenging situations in the future. Thanks to Greg Bowen, Construction Project Manager, GDOT LaGrange area office, Jerry Jones, Construction Project Manager, GDOT Cartersville area office, and Wes King, Assistant Area Engineer, GDOT Cartersville area office for pictures and information.

(see related article [Bridge Restoration](#) p. 10)





**Eagle Drive, Cherokee County, 2005**



**Ball Field Road, Waleska, Cherokee County, 2004**

## MUTCD to be Revised in 2009

The section below and the charts on the following pages are excerpted from the revised 2003 MUTCD. The complete MUTCD is available online at the FHWA website at <http://mutcd.fhwa.dot.gov>. The most recent changes and proposed revisions are also available on the site. **A REVISED EDITION WILL BE COMING OUT IN 2009. FHWA and LTAP will be offering classes with an overview of the changes.** The LTAP Office is also evaluating offering a “Basics of the MUTCD” Class and would like to hear from those of you who are interested in order to plan classes.

### MUTCD Chapter 2B. Regulatory Signs

#### Section 2B.01 Application of Regulatory Signs

**Standard: Regulatory signs shall be used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements.**

**Regulatory signs shall be installed at or near where the regulations apply. The signs shall clearly indicate the requirements imposed by the regulations and shall be designed and installed to provide adequate visibility and legibility in order to obtain compliance.**

**Regulatory signs shall be retroreflective or illuminated to show the same shape and similar color by both day and night, unless specifically stated otherwise in the text discussion of a particular sign or group of signs (see Section 2A.08).**

**The requirements for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.**

#### Section 2B.02 Design of Regulatory Signs

Support:

Most regulatory signs are rectangular, with the longer dimension vertical. The shapes and colors of regulatory signs are listed in Tables 2A-4 and 2A-5, respectively. Exceptions are specifically noted in the following Sections.

The use of educational plaques to supplement symbol signs is described in Section 2A.13.

Guidance:

Changeable message signs displaying a regulatory message incorporating a prohibitory message that includes a red circle and slash on a static sign should display a red symbol that approximates the same red circle and slash as closely as possible.

#### Section 2B.03 Size of Regulatory Signs

**Standard: The sizes for regulatory signs shall be as shown in Table 2B-1.**

Guidance:

The Freeway and Expressway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the regulation or where physical conditions preclude the use of the other sizes.

The Oversized size may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Signs larger than those shown in Table 2B-1 may be used (see Section 2A.12).



**Figure 2B-1. STOP, YIELD, Speed Limit, FINES HIGHER, and Photo Enforcement Signs**



R1-1



R1-3



R1-4



R1-2

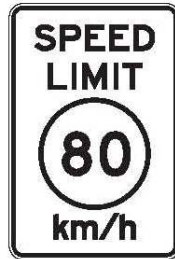


R1-2a



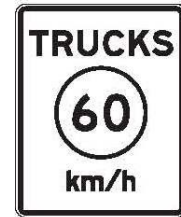
R2-1

OR



R2-2

OR

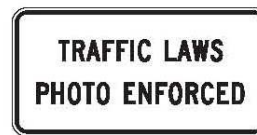


R2-3

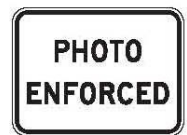
OR



R2-6

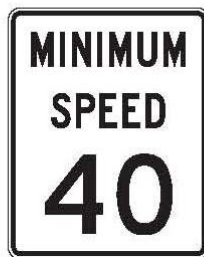


R10-18



R10-19

**Figure 2B-3. Speed Limit and Turn Prohibition Signs**



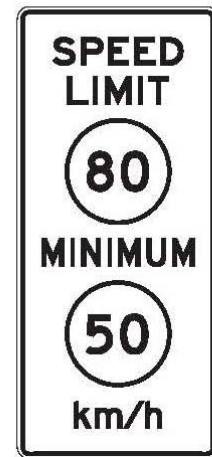
R2-4

OR



R2-4a

OR



R3-1



R3-2



R3-3

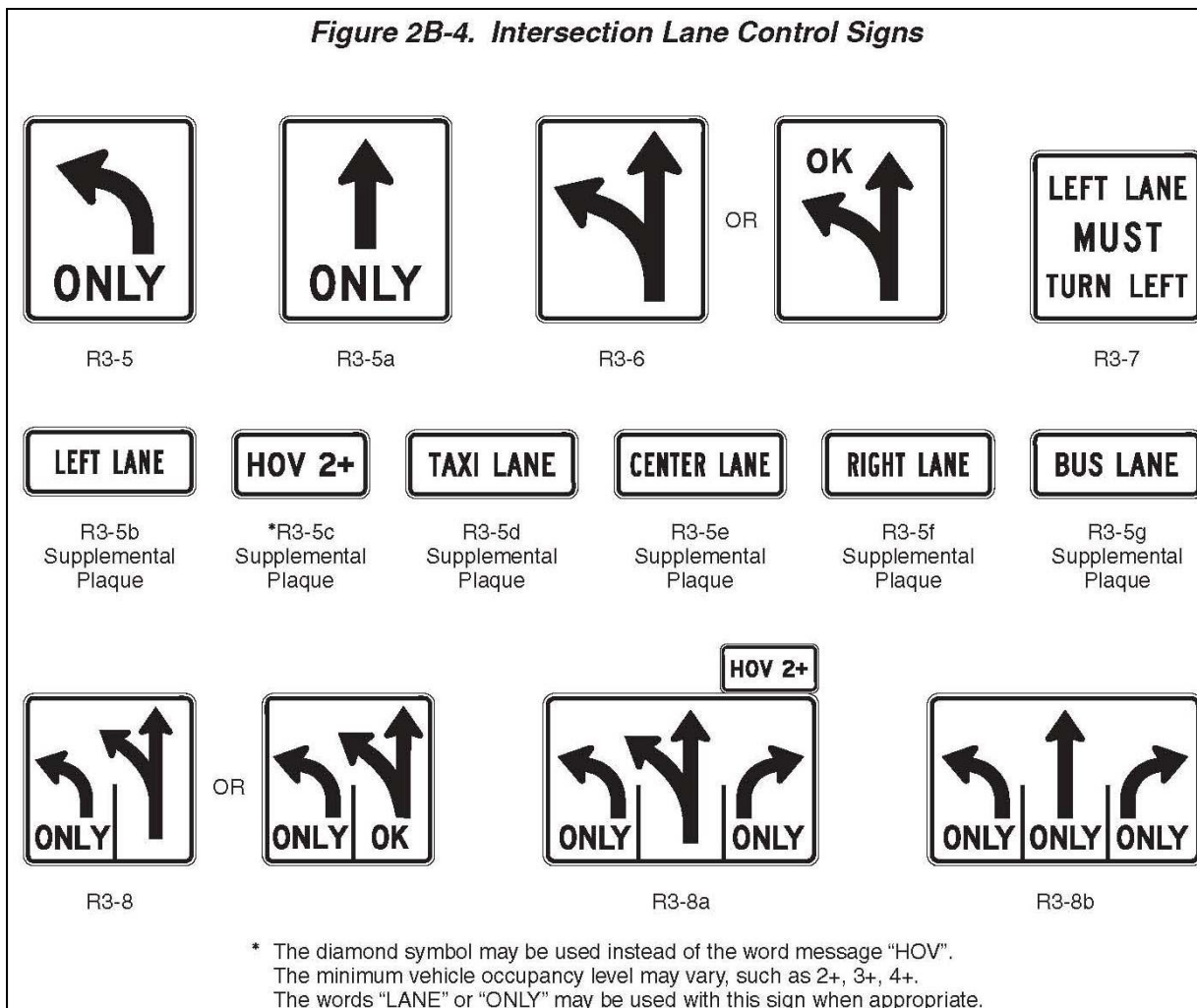


R3-4



R3-18

**Figure 2B-4. Intersection Lane Control Signs**



These Charts show the correct style and wording for regulatory signs. The sign code as used in traffic engineering is shown under the sign. The Standard Highway Signs Manual gives exact design measurements and sign sizes and is available online at [http://mutcd.fhwa.dot.gov/ser-shs\\_millennium.htm](http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm)

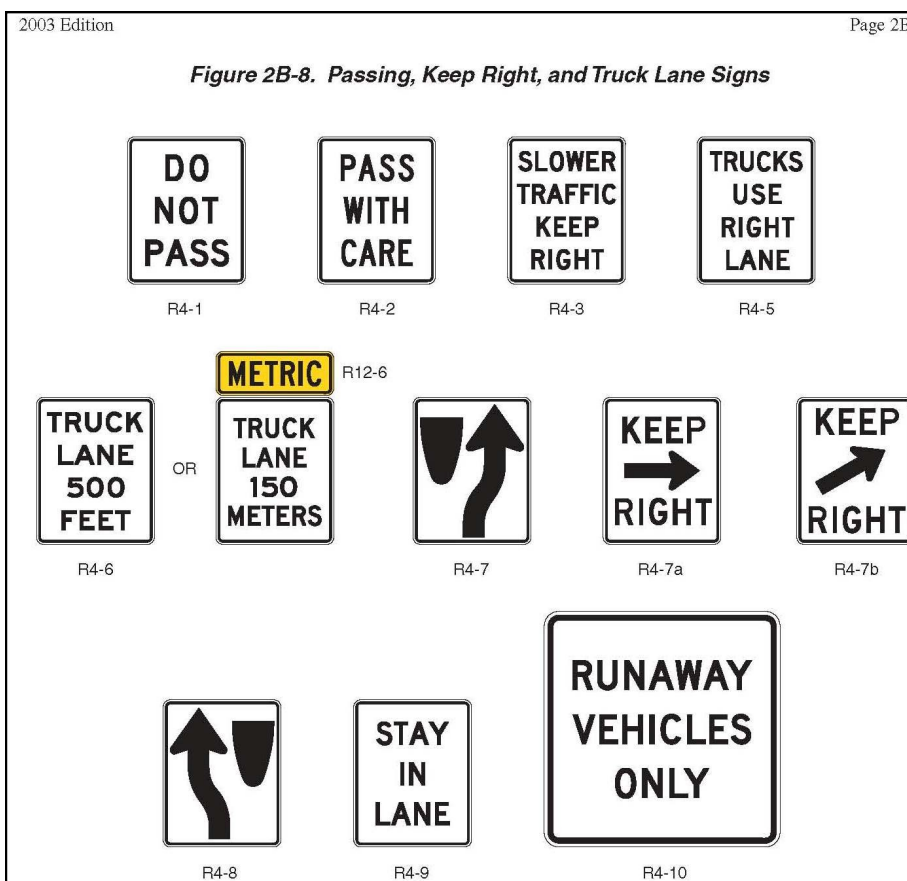


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2003 Edition

Page 2B-

**Figure 2B-8. Passing, Keep Right, and Truck Lane Signs**



CUT AND SAVE GUIDE



## New High Visibility Standards

A new standard that requires the use of high visibility clothing (as defined by the [ANSI/ISEA 107 standard](#)) when working in the right-of-way on federal-aid highways went into effect November 24, 2008. The Federal Highway Administration (FHWA) established a new Part in title 23, Code of Federal Regulation, (CFR) that requires the use of high visibility safety apparel and provides guidance on its application. This rulemaking applies to all workers who are working within the rights-of-way of Federal-aid highways who are exposed either to traffic or to construction equipment within the work area. The term “worker” in this rule is very broad and includes all workers who respond to incidents, which also includes media representative when covering events on highways. However, the rule includes an exception for law enforcement officers. They are required to wear high visibility garments only when they are directing traffic and/or investigating crashes. The FHWA, concerned about workers safety, took this action because there has been an increase in the amount of maintenance and reconstruction work on the nation’s highways that is being accomplished in stages, while traffic continues to use a portion of the street or highway for travel. This has resulted in an increase in the exposure of workers on foot to high-speed traffic and a corresponding increase in the risk of injury or death for highway workers. The need to be seen by those who drive or operate vehicles or equipment is recognized as a critical issue for worker safety. By increasing the visibility of workers, this should decrease the likelihood of fatalities or injuries to workers on the rights-of-way of Federal-aid highways.

There has been some confusion with respect to the definition of high visibility garments. The rule uses the [ANSI/ISEA 107-204](#) version of the Standard for High Visibility Safety Products and defines Class II or Class III garments as high visibility garments. After this rule was published, ANSI issued a new standard for public safety garments ([ANSI 207-2006](#)). These new garments are not included in the rule, therefore, are not compliant at this time. However, FHWA believes that these

new public safety garments ([ANSI 207-2006](#)) are compatible with [ANSI 107-2004 Class II](#) garments and we are currently in a rulemaking process to incorporate the public safety garments in the Worker Visibility rule. No specific one color is defined and required agencies are encouraged to use the color that provides the greatest background for workers. For example if you are working around orange barrels, then a lime green color would provide the greatest visibility.

Major changes in the [ANSI/ISEA 107-2004](#) version of the Standard for High Visibility Safety Products include:

**Class 3 Sleeveless garments:** In 2000 ISEA disseminated an official position That Class 3 cannot be met by a sleeveless garment alone. This position is further clarified in [ANSI/ISEA 107-2004](#). Section 5.2.1 of [ANSI/ISEA 107-2004](#) states that "Regardless of the area of materials used, a sleeveless garment or a vest alone **shall not** be considered Performance Class 3. Manufacturers and users should be aware that both the [ANSI/ISEA 107-1999](#) or 2004 versions of the standard does not recognize any type of sleeveless garment to be considered class 3 when worn alone.

The title is now, [\*Standard for High Visibility Safety Products and Headwear\*](#). The standard addresses the minimum performance requirements and area of materials for headwear such as knit caps, ball caps and other hats that enhance the visibility of the head.

All references to classes of garments and their use in environments based on vehicle speeds have been removed. This version of the standard emphasizes that garment selection should be based on the color and complexity of the work environment, task load of the worker, separation of the worker and moving equipment and vehicles and other work environment variables.

For further information contact FHWA, Office of Transportation Operations at 202 366-5915 or you can access the Worker Visibility rule at [www.gpoaccess.gov/cfr/retrieve.html](http://www.gpoaccess.gov/cfr/retrieve.html).

## BRIDGE RESTORATION

Savannah's 155 year-old Central of Georgia Railroad Bridge is currently being restored to repair years of damage and neglect. It was last used in the early 1960's. The Coastal Heritage Society plans to put it back into service for 250,000 pound tourist trains in the future. The Central of Georgia Railroad Shops and Terminal/Savannah Visitors Center is adjacent to the bridge.

The most serious damage to the structural integrity of the bridge was from oversized trucks that damaged the brickwork of the arch underside. The restoration includes replacing damaged brickwork and repointing the entire bridge. One parapet was separating from the arch and this was pinned and bound to prevent further separation. The soil fill that



### REPAIRED AND RESTORED

an organic herbicide to remove moss and vegetation from the bridge with damaging it.

Guardrail will be installed to keep trucks in the center of the arch and to prevent further damage. The city council will also evaluate rerouting truck traffic by ordinance. Additional signing is also being considered to help with the problem.

The bridge was originally designed by Martin P. Muller and Augustus Schwaab and was built by Benjamin F. Armstrong. Hunter Saussy Engineering is conducting structural and capacity analysis to determine what load the restored bridge will be able to support. Preliminary investigation of the bridge's history reveals that it may be capable of carrying four times its original design load supported by the fact that locomotives increased in size that much over its original life.

Thanks to Linwood Brown, Facilities Maintenance Project Manager of the City of Savannah for pictures and information on this project. If you are in Savannah it is worth the effort to check it out.



Please share your stories with the LTAP community. Contact the LTAP office.



### TRUCK DAMAGE

formed the railroad bed was removed in order to restore the arches and the drainage system. The drainage system uses a mixture of sand, clay, and river pebbles called "puddle clay" along with dry stacked brick.

The City of Savannah is funding the project. The Coastal Heritage Society is documenting the historical aspects of the bridge as it is repaired and ensuring that the restoration is historically accurate. The search for a historically correct mortar was one of the challenges. Another challenge was the search for



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 LOCAL TECHNICAL ASSISTANCE PROGRAM  
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Working with Georgia Cities and Counties to Improve Transportation



Railroad Bridge over Savannah Ogeechee Canal



CENTRAL OF GEORGIA BRIDGE WITH EARTH ROADBED REMOVED, SAVANNAH



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CUT OR FOLD AND TAPE IF INCLUDING COMMENTS

## ABOUT THE CONTENT OF GEORGIA ROADS....

I find the writing to be (check one below):

\_\_\_\_\_ too technical \_\_\_\_\_ not technical enough \_\_\_\_\_ at the technical level I want

I rate the appearance to be (check one):

\_\_\_\_\_ not appealing \_\_\_\_\_ not clear enough \_\_\_\_\_ appealing \_\_\_\_\_ clear

Rank the following subject areas from 1 to 6 in order of importance to you:

One being the most important

\_\_\_\_\_ Research \_\_\_\_\_ Technology and Engineering \_\_\_\_\_ Innovative ideas

\_\_\_\_\_ APWA membership news \_\_\_\_\_ Maintenance \_\_\_\_\_ Questions and Opinions

I feel this newsletter (check all that apply)

\_\_\_\_\_ keeps readers up to date on innovation, technology, and maintenance

\_\_\_\_\_ provides me with useful information of local interest

\_\_\_\_\_ provides me with useful in my job

Comments: \_\_\_\_\_

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## Georgia Department of Transportation Local Technical Assistance Program

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## GEORGIA ROADS

Is a technical newsletter about local roads published by the Georgia Department of Transportation Local Technical Assistance Program. It is written for Georgia's municipal and county employees who are responsible for planning and managing local roads. All of your comments, questions, and suggestions are welcome. Please call us toll free at 1-800-573-6445